

Spiradiclis scorpiura (Rubiaceae), a new species from Guangxi, China

You Nong¹, Li-Qun Lei², Lei Wu³, Qi-Min Hu¹, Ying-Jing Li¹, Xin-Cheng Qu¹, Chuan-Gui Xu¹, Gui-Yuan Wei¹

¹ Guangxi Key Laboratory of Traditional Chinese Medicine Quality Standards, Guangxi Institute of Chinese Medicine & Pharmaceutical Science, No. 20–1 Dongge Road, Nanning, Guangxi, China

² Nanning Botanical Garden, Nanning Qingxiushan Scenic and Historic Tourism Development Co., Ltd, Nanning, Guangxi, China

³ College of Forestry, Central South University of Forestry and Technology, Changsha, Hunan, China

Corresponding authors: Chuan-Gui Xu (xuchuangui2021@163.com); Gui-Yuan Wei (weiguiyuan24@163.com)

Abstract

Spiradiclis scorpiura (Rubiaceae), a new calcareous species found in Guangxi, China, is described and illustrated. This new species is similar to *S. coccinea*, *S. scabrida*, and *S. purpureocaerulea* in having pubescent stems and subglobose capsules, but it is easily distinguished by its cincinnous inflorescence and its triangular, 1–2 mm long, pubescent bracteoles. According to the IUCN criteria, it is considered Data Deficient (DD) until more information becomes available. Photographs, an illustration, a distribution map, and a comparative table with the most similar species are provided.

Key words: Daxin County, limestone, new species, sinkhole, taxonomy

Introduction

Spiradiclis Blume closely resembles *Ophiorrhiza* L., and the two genera are in the tribe Ophiorrhizeae based on morphological characteristics (Verdcourt 1958; Darwin 1976; Lo 1999; Chen and Taylor 2011; Wu et al. 2019) and molecular evidence (Bremer 2009; Rydin et al. 2009; Wikström et al. 2013; Razafimandimbison and Rydin 2019). Razafimandimbison and Rydin (2019) suggested that *Spiradiclis* is a synonym of *Ophiorrhiza*. However, we consider that the delimitation and relationship of the two genera still need further research, and since *Spiradiclis* is morphologically different from *Ophiorrhiza* by its linear-oblong or subglobose capsules with four valves (vs. obcordate and compressed capsules with two valves), we prefer the traditional concept of *Spiradiclis*, thereby considering it separate from *Ophiorrhiza*.

There are a total of 62 *Spiradiclis* species, according to Plants of the World Online (POWO 2024). They are distributed in southeastern Asia, including Bhutan, China, India, Indonesia, Myanmar, and Vietnam. Most of the species are distributed in China and are native to the south and southwest of the country. In the last decade, more than 20 new species of *Spiradiclis* have been discovered in China (e.g., Wang 2016; Zhang et al. 2018; Pan et al. 2019; Tong et al. 2020; Cai et al. 2022; Nong et al. 2024).



Academic editor: Petra De Block

Received: 20 October 2024

Accepted: 14 January 2025

Published: 10 February 2025

Citation: Nong Y, Lei L-Q, Wu L, Hu Q-M, Li Y-J, Qu X-C, Xu C-G, Wei G-Y (2025) *Spiradiclis scorpiura* (Rubiaceae), a new species from Guangxi, China. PhytoKeys 252: 41–49. <https://doi.org/10.3897/phytokeys.252.139783>

Copyright: © You Nong et al.

This is an open access article distributed under terms of the Creative Commons Attribution License (Attribution 4.0 International – CC BY 4.0).

During field surveys in Daxin County, Guangxi, in July 2024, a *Spiradiclis* population was found in flower and fruit that was morphologically similar to *Spiradiclis coccinea* H.S.Lo. However, this newly collected *Spiradiclis* is distinctly different from *S. coccinea* by its elliptic leaves and cincinnous inflorescence. Therefore, this population was suspected to represent a new species. This was confirmed by more observations, the examination of specimens of closely related *Spiradiclis* species from the herbaria PE, IBK, GXMI, and KUN, and by consulting relevant literature. Hence, we confirm that the unusual plant is a species of *Spiradiclis* new to science, and the newly discovered taxon is here described as a new species.

Materials and methods

Fieldwork was carried out in Daxin County, Guangxi, to document the new species in its natural habitat. In addition, studies of herbarium material of various *Spiradiclis* species were conducted at PE, IBK, GXMI, and KUN, and relevant literature was consulted (Lo et al. 1983; Wang 2002; Wang et al. 2015; Wu et al. 2015, 2016, 2019; Pan et al. 2016; Liu et al. 2017; Zhang et al. 2018; Wen et al. 2019; Li et al. 2021; Song et al. 2022). Additional related *Spiradiclis* species were examined based on online images from the Kew Herbarium Catalogue (<http://apps.kew.org/herbcat/gotoHomePage.do>) and JSTOR Global Plants (<http://plants.jstor.org/>). Morphological characteristics of stems, leaves, pedicels, flowers, receptacles, gynoecea, and carpels were used to distinguish *Spiradiclis* species in this study.

The description is based on the type specimens. Measurements were made with a tape measure and callipers. The structure of the indumentum and its distribution were observed and described using a dissecting microscope at magnifications of more than 20×. Additional information on locality, habitat, ecology, plant form, and fruits was collected in the field. The preliminary conservation threat assessment followed IUCN Categories and Criteria (IUCN 2022).

Results and discussion

Taxonomy

***Spiradiclis scorpiura* Y.Nong & L.Wu, sp. nov.**

urn:lsid:ipni.org:names:77356517-1

Figs 1–4

Chinese name. xiē wěi luó xù cǎo (蝎尾螺序草).

Diagnosis. *Spiradiclis scorpiura* is most similar to *S. coccinea* but is different in its densely pubescent young stems that become glabrous when older (vs. glabrous or subglabrous), its cincinnous inflorescences (vs. cymose), its triangular, 1–2 mm long, pubescent bracteoles (vs. subulate, 3–4 mm long, glabrous), its calyx puberulent outside (vs. glabrescent outside), and its capsule 3–4 mm in diam. (vs. 4.5–5.5 mm in diam.).

Type. CHINA • Guangxi, Daxin County, 22°54'06"N, 106°50'02"E, alt. 504 m, at the rim of the top of a sinkhole, 11 July 2024, flowering, Y. Nong NY2024071101 (GXMI). (**Holotype:** GXMI! 051187; isotype: IBK!).

Description. Subshrubs, perennial, 20–50 cm tall, rooting near base, stems ascending; stems densely pubescent when young but glabrous when old.

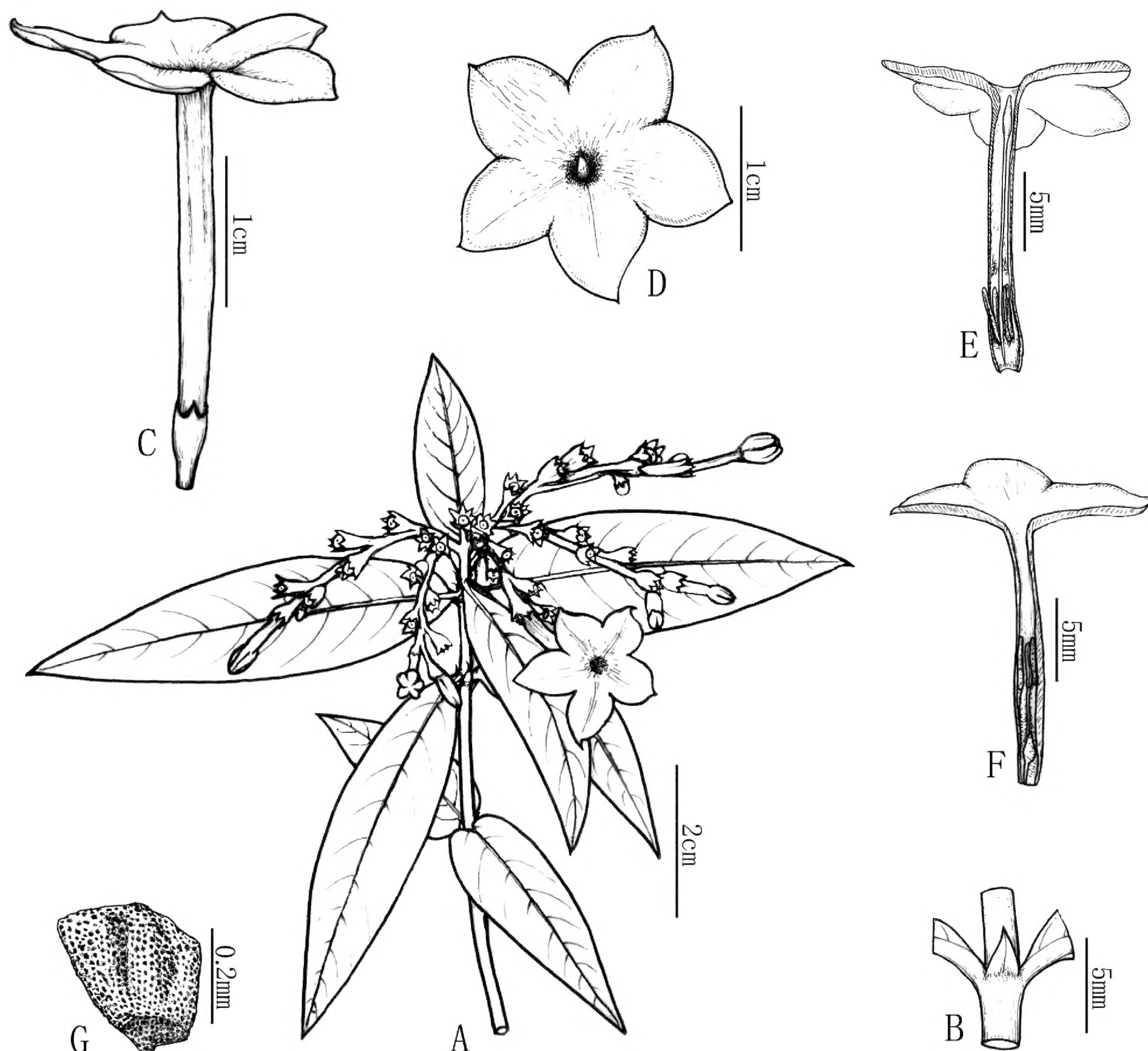


Figure 1. Line drawing of *Spiradiclis scorpiura* Y.Nong & L.Wu **A** flowering plant **B** stipule **C** flower **D** long-styled flower, frontal view, showing corolla lobes and stigma **E** longitudinally opened long-styled flower, showing the position of the stamens and the style and stigma **F** longitudinally opened short-styled flower, showing the position of the stamens and the style and stigma **G** seed (Drawn by Xin-cheng Qu).

Leaves opposite; petiole 1–2 mm long, sparsely pubescent; blade drying papery, adaxially olive green, abaxially yellowish green, elliptic, 3–7 × 0.5–1.5 cm, sparsely pubescent or glabrous on both surfaces, margin entire, base cuneate, apex acuminate; secondary veins 8–12 on each side of the midrib, midrib concave adaxially and prominently convex abaxially; stipules triangular, 1–2 mm long, glabrous outside, apex acute. Inflorescences terminal, cincinnous, 3–6 branched, 3–44-flowered, pubescent; peduncles 0.6–1 cm long, pubescent; pedicels short, c. 1 mm long, pubescent; bracteoles triangular, 1–2 mm long, pubescent outside. Flowers distylous. Calyx pubescent; hypanthium portion obovate, 1–2 mm long, with 5 straight ridges; lobes 5, triangular or ovate-lanceolate, 1–1.5 mm long. Corolla purple, slenderly salverform-funnelform, glabrous or pubescent outside; tube 15–18 mm long, lobes broadly ovate to suborbicular, 6–8 mm long. Stamens 5. Style filiform, stigma clavate,

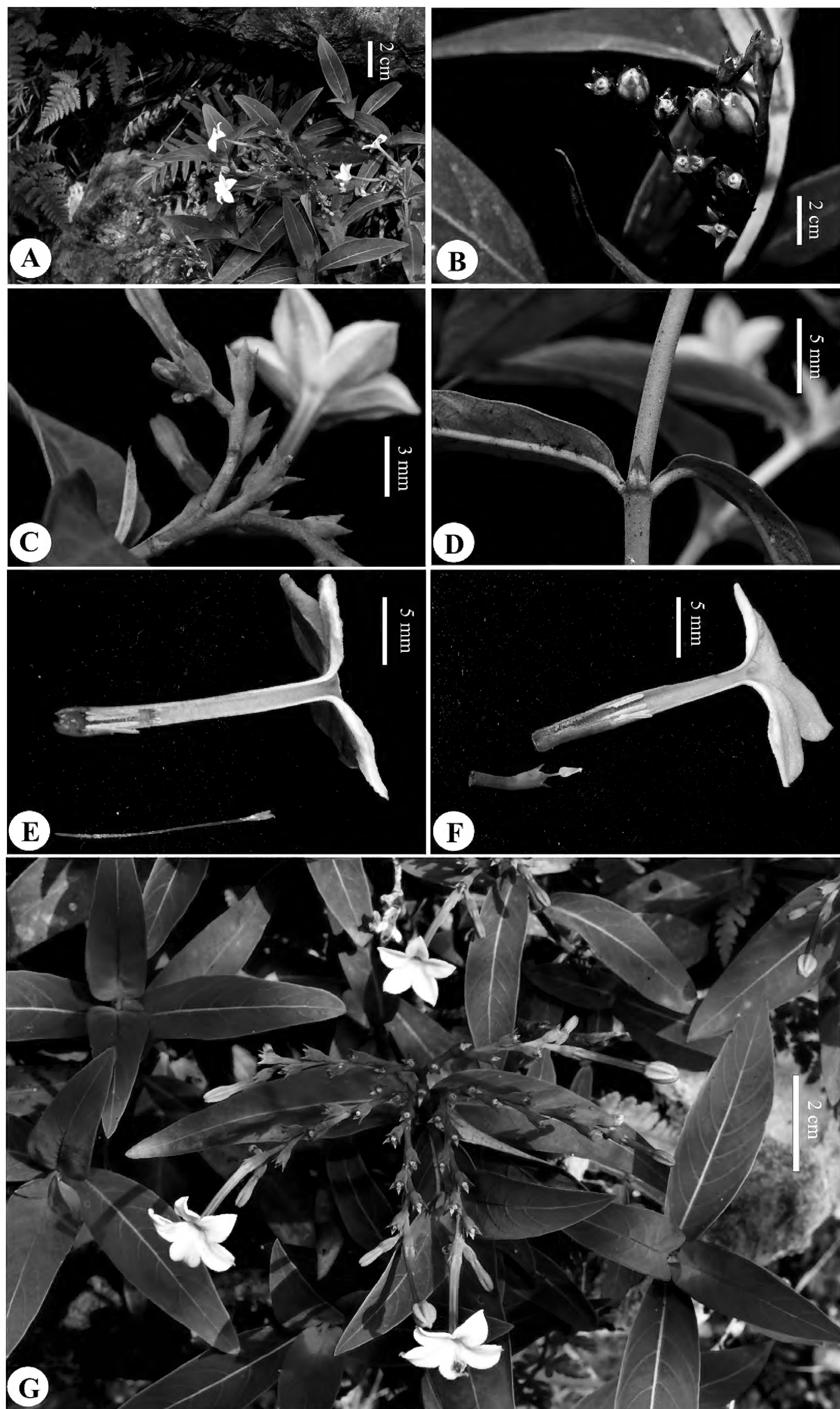


Figure 2. *Spiradiclis scorpiura* Y.Nong & L.Wu **A** habit **B** detail of fruiting plant **C** inflorescence **D** stipule **E** longitudinally opened, long-styled flower **F** longitudinally opened, short-styled flower **G** flowering plant (photographed and edited by You Nong).

标本采集记录签(Record label)
采集号(No.): NY2024071101
标本份数(Number of specimens): 6 份
采集人(Collector): 农友、韦贵元
采集日期(Date): 2024 年 7 月 11 日
采集地点(Location): 广西大新县硕龙镇巧家屯
环境(Environment): 天坑口
出现多度(Abundance): 一般
生活型(Life-form): 亚灌木
株高(Height):
枝、叶(Branches and leaves):
花(Flower): 紫色
果实及种子(Fruits and seeds):
科名(Family): 茜草科
植物名 (Name):
备注 (Remark): 螺序草属

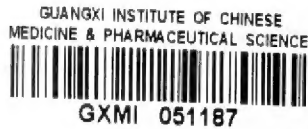


Figure 3. Holotype specimen of *Spiradiclis scorpiura* Y.Nong & L.Wu, Y. Nong NY2024071101 (GXMI! 051187).

2-lobed, lobes linear, c. 2 mm long. Long-styled flowers: corolla tube with pilose ring above stamens inside; stamens born near the base of the tube, anthers sessile or subsessile, c. 3 mm long; style c. 1.5 cm long or slightly longer. Short-styled flowers: corolla tube pubescent near the base inside;

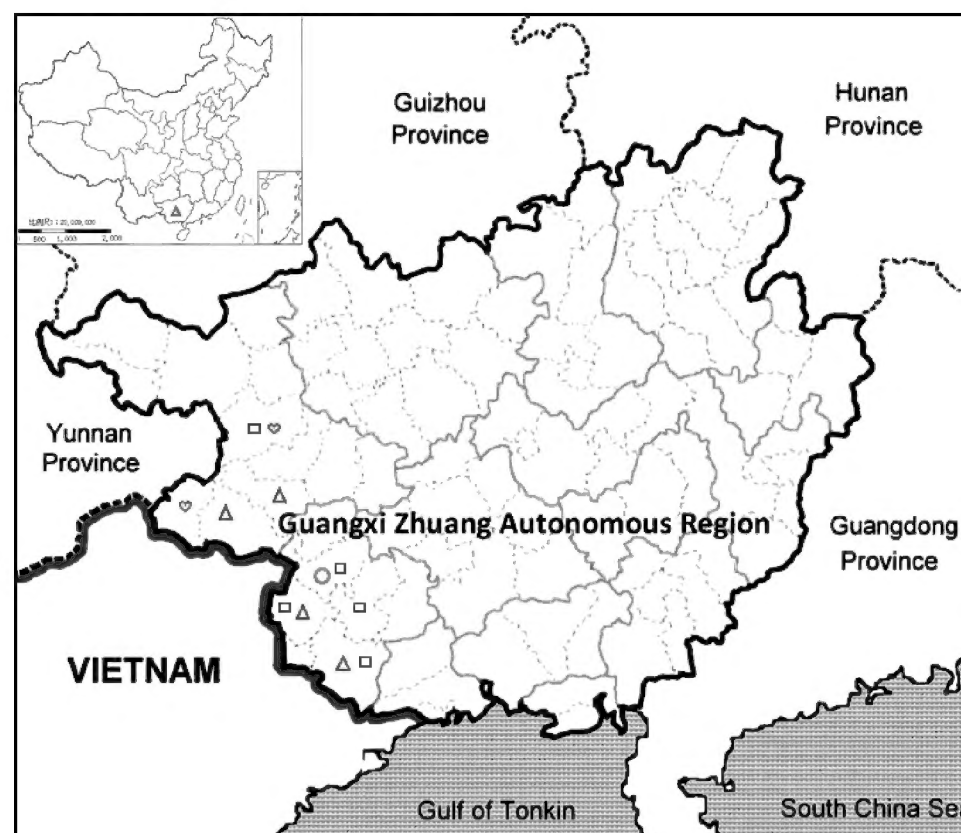


Figure 4. Distribution of *Spiradiclis scorpiura* (red circle), *S. coccinea* (green triangle), *S. scabrada* (blue heart), and *S. purpureocaerulea* (purple square) in Guangxi (blue triangle in insert map), China.

stamens born in the middle of the tube, anthers sessile or subsessile, c. 2 mm long; style c. 4 mm long. Capsules subglobose, 3–4 mm in diam., glabrescent, valves 4. Seeds numerous, angular, c. 0.2 mm in diam.

Phenology. Flowering and fruiting in June–July.

Etymology. The specific epithet “*scorpiura*” refers to the terminal, cincinnous inflorescences of the new species.

Distribution and habit. Known only from southeast Guangxi, China. The species has only been found at the rim of a sinkhole at elevations of 504 m.

Preliminary IUCN red list category. Data available for the new species, only known from the type locality and the type specimens, are insufficient to assess its conservation status. According to the IUCN Criteria (IUCN 2022), it is considered Data Deficient (DD) until more information becomes available. *Spiradiclis scorpiura* is currently known from a single, relatively large population. Further collection and monitoring are necessary to allow more conclusive estimations about the rarity and vulnerability of the species.

Comparison with other *Spiradiclis* species

In addition, *S. scorpiura* also looks similar to *S. scabrada* D.Fang & D.H.Qin, but is different by its shorter petioles (1–2 mm vs. 2–5 mm long), its cincinnous inflorescences (vs. corymbose-cymose), and its triangular, 1–2 mm long, pubescent bracteoles (vs. linear, 2–5 mm long, glabrous). *Spiradiclis scorpiura* is also similar to *S. purpureocaerulea* H.S.Lo, but it differs in its densely pubescent young stems that become glabrous when old (vs. densely pubescent young and old stems), its elliptic leaves, pubescent or glabrous on both surfaces (vs. ovate, adaxially densely strigose-hispidulous, abaxially densely pubescent), its 1–2 mm long petioles (vs. 5–20 mm long), its cincinnous inflorescences (vs. congested-cymose), and its triangular, 1–2 mm long, pubescent bracteoles (vs. narrowly lanceolate, 4–5 mm long, densely pubescent). More detailed morphological differences amongst the similar species are shown in Table 1.

Table 1. Main morphological differences between *Spiradiclis scorpiura*, *S. coccinea*, *S. scabrida*, and *S. purpureocaerulea*.

Morphological traits	<i>S. scorpiura</i>	<i>S. coccinea</i>	<i>S. scabrida</i>	<i>S. purpureocaerulea</i>
Stems	densely pubescent when young but glabrous when old	glabrous or subglabrous	pubescent to glabrescent	densely pubescent
Leaves	elliptic, sparsely pubescent or glabrous on both surfaces	narrowly elliptic-oblong or elliptic-oblong, glabrous on both surfaces	ovate, narrowly ovate, or lanceolate, abaxially glabrous or occasionally sparsely strigillose or scabridulous at least on principal veins	ovate, adaxially densely strigose-hispidulous, abaxially densely pubescent
Length of petioles	1–2 mm	1–2 mm	2–5 mm	5–20 mm
Stipules	triangular, 1–2 mm long, glabrous outside	triangular, rapidly narrowed to subulate, 4–5 mm long, glabrous outside	subtriangular, 0.7–1 mm long, subglabrous outside	subulate, 2–3 mm long, pubescent outside
Inflorescence	cincinnous, 3–6-branched, pubescent	cymose, with more than 10 flowers, pubescent	corymbose-cymose, 3-24-flowered, pubescent, puberulent, or glabrescent	congested-cymose, densely pubescent
Bracteoles	triangular, 1–2 mm long, pubescent outside	subulate, 3–4 mm long, glabrous outside	linear, 2–5 mm long, glabrous outside	narrowly lanceolate, 4–5 mm long, densely pubescent outside
Calyx	puberulent outside; hypanthium portion obovate, 1–2 mm long, with 5 straight ridges; lobes triangular or ovate-lanceolate, 1–1.5 mm long	glabrescent outside; hypanthium portion obconic, 1.2–1.5 mm long; lobes narrowly lanceolate, 1.7–2 mm long	puberulent outside; hypanthium portion obovate, 1–1.5 mm long; lobes ovate-lanceolate, 1–1.5 mm long	pubescent outside; hypanthium portion obconic-globose, c. 2 mm long; lobes narrowly lanceolate, 4–4.5 mm long
Corolla	tube 15–20 mm long, lobes broadly ovate to suborbicular, 6–8 mm long	tube 15–18 mm long, lobes broadly ovate to suborbicular, 4.5–6 mm long	tube 25–26 mm long; lobes ovate, c. 3.5 mm long	tube 19–21 mm long; lobes subovate, c. 6 mm long
Capsule	subglobose, 3–4 mm in diam.	subglobose, 4.5–5.5 mm in diam.	subglobose, 3–4 mm in diam.	subglobose, 4–4.5 mm in diam.

Acknowledgements

The authors are grateful to Xiang-Chun Lan for fieldwork assistance and Xin-Cheng Qu for the line drawing (Guangxi Institute of Traditional Medical and Pharmaceutical Sciences, Nanning).

Additional information

Conflict of interest

The authors have declared that no competing interests exist.

Ethical statement

No ethical statement was reported.

Funding

This work was supported by the Guangxi Forestry Science and Technology Promotion Demonstration Project (Guilin Kezi [2021] No. 26) and the Survey and Collection of Germplasm Resources of Woody & Herbaceous Plants in Guangxi, China (GXFS–2021–34).

Author contributions

Data curation: YN; Funding acquisition: YN and CGX; Investigation: YN, CGX, and YGW; Methodology: YN, LQL, and YGW; Project administration: YN and YJL; Supervision: QMH, LW; Visualisation: YN, LQL, QXC; Writing—original draft: YN; Writing—review and editing: YN.

Author ORCIDs

You Nong  <https://orcid.org/0000-0001-7004-0946>

Li-Qun Lei  <https://orcid.org/0009-0009-7319-5439>

Lei Wu  <https://orcid.org/0000-0003-1451-7855>

Qi-Min Hu  <https://orcid.org/0009-0003-0490-3557>

Ying-Jing Li  <https://orcid.org/0009-0008-4849-2426>

Xin-Cheng Qu  <https://orcid.org/0009-0009-9078-9976>

Chuan-Gui Xu  <https://orcid.org/0009-0000-6263-3821>

Gui-Yuan Wei  <https://orcid.org/0000-0003-0652-1213>

Data availability

All of the data that support the findings of this study are available in the main text.

References

- Bremer B (2009) A review of molecular phylogenetic studies of Rubiaceae. *Annals of the Missouri Botanical Garden* 96(1): 4–26. <https://doi.org/10.3417/2006197>
- Cai JH, Shui YM, Song XF, Wu L (2022) Validation of the name *Spiradiclis elliptica* (Rubiaceae), a new species endemic to southwestern China. *Phytotaxa* 545(1): 110–114. <https://doi.org/10.11646/phytotaxa.545.1.10>
- Chen T, Taylor CM (2011) *Spiradiclis*. In: Wu ZY, Raven PH, Hong DY (Eds) *Flora of China*. Vol. 19. Science Press, Beijing & Missouri Botanical Garden Press, St. Louis, 330–339.
- Darwin SP (1976) The Pacific species of *Ophiorrhiza* L. (Rubiaceae). *Lyonia* 1: 48–101.
- IUCN (2022) Guidelines for using the IUCN Red List Categories and Criteria, version 14. Prepared by the Standards and Petitions Committee. <https://www.iucnredlist.org/resources/redlistguidelines> [Accessed 15 October 2024]
- Li JL, Yuan Q, Liu Y, Song XF, Pan B, Qu CH, Wu L (2021) Two new species of *Spiradiclis* (Rubiaceae) from limestone areas in southwestern China. *Nordic Journal of Botany* 39: e02979. <https://doi.org/10.1111/njb.02979>
- Liu J, Pan B, Li SW, Xu WB (2017) *Spiradiclis quanzhouensis* (Rubiaceae): A new species from limestone area in Guangxi, China. *Nordic Journal of Botany* 36(3): e01595. <https://doi.org/10.1111/njb.01595>
- Lo HS (1999) *Spiradiclis* Blume. In: Lo HS (Ed.) *Flora Reipublicae Popularis Sinicae*. Vol. 71(1). Science Press, Beijing, 86–110.
- Lo HS, Sha WL, Chen XX (1983) A revision of the genus *Spiradiclis* Bl. *Acta Botanica Austro Sinica* 1: 27–36.
- Nong Y, Lei LQ, Wei GY, Qu XC, Zhao ZY, Feng B, Xu CG, Wu L (2024) *Spiradiclis yanii* (Rubiaceae), a new species from Guangxi, China. *PhytoKeys* 247: 173–181. <https://doi.org/10.3897/phytokeys.247.123867>
- Pan B, Ma HS, Wang RJ (2016) *Spiradiclis pengshuiensis* (Ophiorrhizeae, Rubioideae), a new species from Chongqing, China. *PhytoKeys* 63: 41–45. <https://doi.org/10.3897/phytokeys.63.8016>
- Pan B, Tu RH, Hareesh VS, Wu L (2019) *Spiradiclis cavicola* (Rubiaceae), a new species from limestone caves in south-western China. *Annales Botanici Fennici* 56(1–3): 1–4. <https://doi.org/10.5735/085.056.0101>
- POWO (2024) Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. <https://powo.science.kew.org/results?f=&q=Spiradiclis> [Accessed 18 October 2024]
- Razafimandimbison SG, Rydin C (2019) Molecular-based assessments of tribal and generic limits and relationships in Rubiaceae (Gentianales): Polyphyly of Pomazoteae

- and paraphyly of Ophiorrhizeae and *Ophiorrhiza*. *Taxon* 68(1): 72–79. <https://doi.org/10.1002/tax.12023>
- Rydin C, Kainulainen K, Razafimandimbison SG, Smedmark JEE, Bremer B (2009) Deep divergences in the coffee family and the systematic position of *Acranthera*. *Plant Systematics and Evolution* 278(1–2): 101–123. <https://doi.org/10.1007/s00606-008-0138-4>
- Song XF, Liu WJ, Chen AX, Yao ZM, Lan HB, Wu L (2022) *Spiradiclis liboensis* (Rubiaceae), a new species from limestone mountain areas in Guizhou, China. *PhytoKeys* 204: 73–81. <https://doi.org/10.3897/phytokeys.204.84397>
- Tong YH, Xia NH, Wu L, Vu TC (2020) Critical notes on *Spiradiclis purpureocaerulea* H.S. Lo (Rubiaceae) from Vietnam. *Adansonia* 42(19): 291–296. <https://doi.org/10.5252/adansonia2020v42a19>
- Verdcourt B (1958) Remarks on the classification of the Rubiaceae. *Bulletin du Jardin botanique de l'État à Bruxelles* 28: 209–281.
- Wang RJ (2002) Two new species of *Spiradiclis* (Rubiaceae) from China. *Novon* 12(3): 420–423. <https://doi.org/10.2307/3393092>
- Wang RJ (2016) *Spiradiclis jingxiensis* sp. nov. (Rubiaceae) from Guangxi, China. *Nordic Journal of Botany* 34(5): 550–552. <https://doi.org/10.1111/njb.01134>
- Wang RJ, Wen HZ, Deng SJ, Zhou LX (2015) *Spiradiclis danxiashanensis* (Rubiaceae), a new species from south China. *Phytotaxa* 206(1): 30–36. <https://doi.org/10.11646/phytotaxa.206.1.5>
- Wen ZJ, Yang JC, Xu YF, Wu L (2019) *Spiradiclis densa* sp. nov. (Rubiaceae) from limestone areas in Guangxi, China. *Nordic Journal of Botany* 37(6): e02190. <https://doi.org/10.1111/njb.02190>
- Wikström N, Neupane S, Kårehed J, Motley TJ, Bremer B (2013) Phylogeny of *Hedyotis* L. (Rubiaceae: Spermacoceae): redefining a complex Asian-Pacific assemblage. *Taxon* 62(2): 357–374. <https://doi.org/10.12705/622.2>
- Wu L, Wang JL, Liu QR (2015) *Spiradiclis pauciflora* (Rubiaceae), a new species from limestone areas in Guangxi, China. *Annales Botanici Fennici* 52(3–4): 257–261. <https://doi.org/10.5735/085.052.0318>
- Wu L, Tong Y, Pan B, Liu QR (2016) *Spiradiclis glabra* sp. nov. (Rubiaceae) from limestone areas in Guangdong, China. *Nordic Journal of Botany* 34(6): 718–721. <https://doi.org/10.1111/njb.01156>
- Wu L, Wang BM, Pan B, Yu XL (2019) *Spiradiclis tubiflora* (Rubiaceae), a new cave-dwelling species from southern China. *PhytoKeys* 130: 217–224. <https://doi.org/10.3897/phytokeys.130.34625>
- Zhang F, Liu Y, Wen ZJ, Wu L (2018) *Spiradiclis lui*, a new species of Rubiaceae from Guangxi, China. *Nordic Journal of Botany* 36(6): e01786. <https://doi.org/10.1111/njb.01786>